

April 13, 2006

Docket Management Facility
U.S. Department of Transportation
Room PL-401, 400 Seventh Street SW.
Washington, DC, 20590-0001

Re: Docket No. USCG-2004-16877
Cabrillo Port Liquefied Natural Gas Deepwater Port Project
Draft Conformity Determination Comments

I. Introduction

I have reviewed and prepared comments on the Cabrillo Port, Liquefied Natural Gas Deepwater Port Project, Draft General Conformity Determination (Draft Conformity Determination), dated March 2006. In particular, I focused on the construction, operation, marine vessel, and Project-associated emissions of ozone precursor pollutants that should have been included in the Draft Conformity Determination. Because the Draft Conformity Determination is based on faulty assumptions, incorrect data, and spurious exemptions, the nonattainment SIP conformity conclusions presented in the document are flawed.

The Draft Conformity Determination must include all Project ozone precursor emissions that have the potential to interfere with the local nonattainment SIPs, including onshore and offshore construction, operation of the FSRU, marine vessel traffic within California Coastal Waters, and any other Project-associated emission increases, such as those that may be caused by the higher heat content of the natural gas supplied to end-users. The construction and operational emissions from the proposed Project were not foreseen and are not included in the State Implementation Plans (SIPs) for the South Coast Air Quality Management District (SCAQMD) or the Ventura County Air Pollution Control District (VCAPCD).

Because of unjustifiable offshore emission exemptions, the Draft Conformity Determination limited its analysis to construction emissions within the boundaries of the SCAQMD and the VCAPCD. The Draft Conformity Determination is clearly inadequate – it ignores the regional nature of ozone and the onshore impacts caused by the offshore emissions. The Draft Conformity Determination does not provide a meaningful analysis of whether the proposed Project is in conformity with the applicable ozone nonattainment SIPs.

II. Qualifications

My comments on the Draft Conformity Determination, presented below, are based on over 25 years of professional experience performing air quality and toxics exposure analyses. I was the senior air quality modeler and air toxics program coordinator for the Santa Barbara County Air Pollution Control District (SBAPCD), where I worked for approximately nine years. At the SBAPCD, I was also responsible for air quality modeling analyses used for determining the effectiveness of NO_x and

ROC control measures on ozone formation, and the resultant process of attaining ozone standards as part of the Santa Barbara County's Air Quality Attainment Plan (AQAP). I also managed the EIR process for the District's AQAP, and I participated in several extensive meteorological analyses in the Santa Barbara Channel.

I am experienced in calculating emissions from offshore sources, including marine vessels. I have performed many air dispersion modeling analyses to determine the onshore impacts from these offshore emissions, and I reviewed and commented on beta-versions of the Minerals Management Service OCD model. As the first regulatory agency user of OCD, I developed detailed instructions for applying the model, as well as for OCDCPM, a hybrid version of OCD that was used in Santa Barbara County for permitting many offshore and coastal sources of air emissions.¹ I sited approximately 30 meteorological and air quality monitoring stations throughout Santa Barbara County, with many of them positioned specifically to track onshore impacts from offshore platform and marine vessel emissions. I also maintained a meteorological monitoring station on Platform Hondo, giving me a unique perspective on winds in the offshore environment.

While at the SBAPCD, I co-developed the mathematical, computer-based model for predicting community exposures to toxic air pollutants that was distributed by CAPCOA, the California Air Pollution Control Officers' Association. These measurements of exposure are often called Health Risk Assessments. CAPCOA is a voluntary association of state and local government officials, largely engineers and scientists responsible for air pollution control in California. The computer model I co-developed (ACE2588) has been used by air districts throughout the state in evaluating AB 2588 submissions by facilities covered by the law, and used extensively by consultants who prepared AB 2588 submissions for the facilities. I provided technical support on using this model for over 10 years, until it was replaced with the California Air Resources Board (CARB) program, HARP. Recipients of this support included regulatory agencies, industrial sources, and consulting firms.

For the past 14 years I have been a private consultant, specializing in regulatory agency and litigation support. My clients include the California Attorney General's Office, the Los Angeles County District Attorney's Office, the California Office of Environmental Health Hazard Assessment, various air pollution control agencies, the California Air Pollution Control Officer's Association, and many private firms. I have prepared over 300 complete air toxics health risk assessments and over 1,000 air dispersion modeling analyses. I have successfully provided expert testimony in numerous Federal and State Court cases. My curriculum vitae is attached.

Following are my comments on the Draft Conformity Determination.

¹ Santa Barbara County Air Pollution Control District, Authority to Construct Permit Processing Manual, Section 6.0, Air Quality Impact Analysis, October 20, 1987.

III. The Draft Conformity Determination is Based on Flawed Methods and Assumptions, Each of Which Errs to the Side of Inadequate Air Quality Protection

In preparing the Draft Conformity Determination, the Coast Guard must comply with Section 176(c) of the Clean Air Act, which prohibits Federal entities from approving projects that do not conform to the SIP for the attainment and maintenance of the NAAQS.² Specifically, the Coast Guard must demonstrate that the Cabrillo Port Project emissions will meet the applicable criteria in 40 CFR 51.858. Generally, this requires a demonstration that project emissions are identified and accounted for in an applicable SIP. If they are not, mitigation or offsets must be identified in order to demonstrate SIP conformity.

The only Project emissions evaluated in the Draft Conformity Determination are those associated with pipeline construction in Los Angeles County. The construction emissions within Los Angeles County are calculated to be 27.4 tons per year, which slightly exceeds the general conformity threshold of 25 tons/year NO_x in a serious nonattainment area. These emissions will require offsetting for the period of time that the construction activities will take place (a few months). These are the only emissions associated with the Project that the Draft Conformity Determination indicates will interfere with any applicable nonattainment SIP.

The Draft Conformity Determination fails to identify and evaluate any other Project emissions that would adversely affect air quality, as required by the Clean Air Act Section 176(c). This regulatory slight-of-hand is accomplished by assigning most of the Project emissions to attainment status areas. In other words, the Draft Conformity Determination does not address the air quality ramifications of any of the Project operational emissions. The same is true for most of the marine vessel and offshore construction emissions as well. The construction and operational emissions from the proposed Project were not foreseen and are not included in the State Implementation Plans (SIPs) for the South Coast Air Quality Management District (SCAQMD) or the Ventura County Air Pollution Control District (VCAPCD).

In the case of construction activities within the VCAPCD, the calculated emissions are 86.4% of the conformity determination level, which is 100 tons/year of NO_x for a moderate nonattainment area. Here again, the Draft Conformity Determination finds that no conformity analysis is required, and therefore does not identify any mitigation or offset requirements. The Draft Conformity Determination, however, relies on optimistic and unverified assumptions used in calculating construction emissions. It is highly likely that construction NO_x emissions within the VCAPCD would exceed the general conformity level of 100 tons/year.

The proposed Project will cause substantial increases in NO_x and ROC emissions (precursors to ozone formation) from onshore and offshore construction, the FSRU, and marine vessels associated with the FSRU. Because of favorable interpretations (for the applicant), the only component subject to the Draft Conformity Determination are the onshore construction NO_x emissions in Los Angeles

² <http://www.epa.gov/ttn/oarpg/genconformity.html>

County. These emissions account for only about five percent of the construction, startup, and first year operational NO_x emissions from the proposed Project.

In order for the Draft Conformity Determination to reach this favorable conclusion for BHP Billiton, a number of non-protective air quality assumptions had to fall into place. In summary, these assumptions include:

- The Project operational and construction emissions are divided among three adjacent and different ozone attainment/nonattainment planning areas. The Draft Conformity Determination never considers the cumulative effects of the total emissions;
- Operational and startup emissions from the FSRU were deemed to be in an ozone attainment area (Anacapa Island), and thus exempt from the Conformity Rule;
- Marine vessel emissions outside three nautical miles from shore were deemed to be in an ozone attainment area (federal waters), and thus exempt from the Conformity Rule;
- The FSRU operational and startup emissions, as well as marine vessel emissions in federal waters were not considered to be subject to the Draft Conformity Determination, even though they will clearly impact onshore air quality;
- The Revised DEIR identifies (but does not assess) the increased emissions caused by potentially higher heating value gas supplied by the Project. These are Project-associated emissions that must be part of the Draft Conformity Determination;
- The onshore construction emissions are likely underestimated due to optimistic schedules, equipment size, equipment rating, and equipment usage;
- The determination that Anacapa Island is in attainment for the Federal ozone standard is irrelevant (and questionable);
- The determination that the FSRU should be assessed using the attainment status for Anacapa Island is inappropriate given that the Project is considerably closer to coastal areas of mainland Ventura and Los Angeles counties.

In each instance where a calculation, assumption, or interpretation is called for, the Draft Conformity Determination leans towards the minimum possible mitigation requirements, or sidesteps them entirely. The flaws in each of these unsubstantiated assumptions, and the effect on the Draft Conformity Determination, are discussed in greater detail below.

IV. Emissions from the FSRU, Associated Marine Vessels, and Offshore Construction Interfere with the VCAPCD and SCAQMD Ozone SIPs

The Draft Conformity Determination exempts all Project emissions greater than three nautical miles from shore from having to conform to the onshore ozone SIPs. This exemption ignores the many thoroughly-documented meteorological analyses verifying that offshore emissions will come onshore and impact mainland air quality.

These Project offshore emissions will have an adverse impact on onshore air quality and must be meaningfully addressed in the Draft Conformity Determination. Ozone is a regional pollutant – it is not restricted to the limited area in which it is emitted. The entire ozone regulatory framework is

guided by this exceedingly clear principle. The effectiveness of control measures and emission reduction strategies are analyzed in regional, Eulerian photochemical models; The requirements for project offsets are expanded to the entire county or air basin in question; Emission inventories are calculated for these same regional impact areas.³

The Draft Conformity Determination sidesteps these established methods and tries to exempt the offshore emissions from having to conform to the area ozone SIPs. It disregards the well-established knowledge that offshore emissions will come onshore, and that they contribute as much as onshore pollutant sources to the ozone nonattainment problem.

In essence, the Draft Conformity Determination divides the Project operational and construction emissions among three adjacent and different ozone attainment/nonattainment planning areas, each with their own, non-overlapping requirements. The Draft Conformity Determination never considers the cumulative effects of the total emissions – in other words, the regional impacts of ozone precursor emissions are ignored.

There are many dozens of published and peer-reviewed accounts demonstrating that offshore emissions in the Project area are part of the onshore ozone nonattainment problem. Even 50 years ago, the *Southland Weather Handbook* presented wind streamlines showing that emissions from the Project location come directly onshore.⁴ From this publication:

The main onshore flow of sea air fans out from Santa Monica to below San Diego, reaching the coast from west-southwest in Santa Monica Bay and from the west-northwest in San Diego County. Islands and hills cause minor variations in the larger pattern, such as the deflecting influence of the Palos Verdes Hills. On the coast northwest of Santa Monica to Santa Barbara the sea air reaches the coast from a more southerly quarter.⁵

Many more sophisticated meteorological analyses have been prepared as part of ozone studies and SIP modeling applications for the South Coast and South Central Coast Air Basins. These analyses focus on the meteorological conditions and trajectories associated with elevated ozone concentrations; however, the general onshore flow patterns are also presented. A few examples of these studies include:

- Various early (1981 and previous) tracer gas releases from offshore and nearshore locations to track onshore impacts and land/sea air recirculation.^{6,7} These tracer gas studies included

³ Tesche, T.W. and McNally, D.E., May 1991. Photochemical Modeling of Two 1984 SCCAMP Ozone Episodes. *Journal of Applied Meteorology*, 30,5,745-763.

⁴ Aldrich, John H. and Myra Meadows. *Southland Weather Handbook*, 1956.

⁵ Ibid, p.6.

⁶ Shair, F.H., Application of Atmospheric Tracer Techniques to Determine the Transport and Dispersion Associated with the Land-Breeze Movement of Air Over the Los Angeles Coastal Zone, California Institute of Technology, prepared for CARB, December 2, 1982. The entire report can be downloaded from CARB at: <http://www.arb.ca.gov/research/apr/past/atmospheric.htm>.

- an offshore release along the coast from Long Beach to Ventura. In all the studied tracer releases, the offshore emissions were found to be advected onshore.
- The South Central Coast Cooperative Aerometric Monitoring Program (SCCCAMP).^{8,9} The SCCCAMP study was performed to develop modeling data for ozone attainment planning analyses in Santa Barbara and Ventura Counties. The mesoscale meteorological patterns observed during SCCCAMP demonstrate the strong onshore patterns in the Project area, as well as the land-sea breeze interaction. These wind flows couple the onshore and offshore areas such that they cannot be analyzed separately (as is being done in the Draft Conformity Determination).
 - The Southern California Air Quality Study (SCAQS).¹⁰ This extensive study analyzed meteorological conditions, emissions, and pollutant formation (including ozone) from Ventura County through the South Coast Air Basin.
 - The 1997 Southern California Ozone Study (SCOS97-NARSTRO).¹¹ The SCOS97 - NARSTRO meteorological network collected data from June 16 through October 15, 1997. Emissions, meteorological, and air quality data were assessed for five different types of multi-day ozone episodes. The interrelated nature of offshore emissions and onshore air impacts is studied and documented.
 - Air Quality Impacts from NO_x Emissions of Two Potential Marine Vessel Control Strategies in the South Coast Air Basin.¹² As part of SCOS97, tracer gases were released from two shipping lanes near the Project area – the current lane and a proposed lane farther from shore. The tracer gases were monitored onshore, and the results showed that both shipping lane releases impacted onshore air quality. Moving the emissions farther offshore did not always benefit onshore air quality, and in one test had a “disbenefit.”¹³
 - Analysis of Aerometric and Meteorological Data for the Ventura County Region.¹⁴ This report describes the various trajectories that carry pollutants into Ventura County, including several emanating from offshore areas.
 - The Structure and Variability of the Marine Atmosphere around the Santa Barbara Channel.¹⁵ This paper studies the mesoscale meteorological conditions between Pt. Arguello and the

⁷ Shair, F.H., et al., Application Transport and Dispersion of Airborne Pollutants Associated with the Land Breeze-Sea Breeze System, October 1981.

⁸ Hanna, Steven R., May 1991. Characteristics of Ozone Episodes during SCCCAMP. *Journal of Applied Meteorology*, 30,5,534-550.

⁹ Douglas, Sharon G. and Kessler, Robert C., May 1991. Analysis of Mesoscale Air Patterns in the South-Central Coast Air Basin during the SCCCAMP 1985 Intensive Measurement Periods. *Journal of Applied Meteorology*, 30,5,607-631.

¹⁰ Blumenthal, D.L., Watson, J.G., and Roberts, P.T. 1987. Southern California Air Quality Study (SCAQS) Program Plan, Sonoma Technology Inc. Report to the California Air Resources Board, June 1987.

¹¹ Fujita, Eric M., et al., February 1999. SCOS97-NARSTRO 1997 Southern California Ozone Study and Aerosol Study, Volume III, Summary of Field Study. Desert Research Institute, prepared for CARB. 1998 AWMA papers available online at: http://www.arb.ca.gov/research/scos/awma_98/awma_98.htm; Publications available online at: <http://www.arb.ca.gov/research/scos/scospub.htm>.

¹² SCAQMD, and CARB, Air Quality Impacts from NO_x Emissions of Two Potential Marine Vessel Control Strategies in the South Coast Air Basin, Final Report, September 2000.

¹³ Ibid., p. 44.

¹⁴ Blumenthal, D.L., Smith T.B., Lehrman, D.E. et al., 1986. Analysis of Aerometric and Meteorological Data for the Ventura County Region, Sonoma Technology Inc. Report to the Western Oil and Gas Association, June 1986.

Santa Monica Basin. The mean wind flow in the Santa Barbara Channel is shown to be strongly onshore, including the winds in the proposed Project area.

All of these studies, and many others, can be referenced to show that the emissions and air flow at the Project location contribute to the onshore ozone nonattainment problem. There is no meteorological or air quality basis for the Draft Conformity Determination to exclude Project emissions from the SIP conformity requirements. Every study points to the opposite conclusion, including the Revised DEIR for the proposed BHP Billiton Project. It is unfortunate that the Draft Conformity Determination is attempting to deny years of intensive studies.

Even BHP Billiton's meteorological data and air quality modeling, which are presented in the Revised DEIR, hurts, rather than helps, the argument for excluding offshore emissions from the nonattainment SIP conformity analysis. The Revised DEIR includes modeling with the Offshore and Coastal Dispersion (OCD) model, which uses five years of meteorological data collected from one onshore (Oxnard Airport) and one offshore (Buoy Station 46025 – Santa Monica Basin) site.¹⁶ These data are for the years 2000 through 2004. While these meteorological data stations were not established with air dispersion modeling in mind (airports and ocean buoys do not generally collect high-quality meteorological data, and are not site-specific), the general wind flow patterns should be adequately characterized by these data. A frequency analysis of the wind speeds and direction (direction from which the wind is blowing) for the Santa Monica Basin Buoy data is presented in the following table.

¹⁵ Dorman, C.E. and Winant, C.D., February 2000. The Structure and Variability of the Marine Atmosphere around the Santa Barbara Channel. Monthly Weather Review, 128, 261-282.

¹⁶ Revised DEIR, Appendix G7 – Sierra Research CEQA Air Quality Assessment.

Wind Frequency Distribution for: Santa Monica Basin Buoy (46025)							
Period of meteorological data set data: 1/1/2000 - 12/31/2004							
Wind Direction Sector (Degrees)	Downwind Area Impacted by this Wind Sector	% Non-Calm Hours	% from 0.1 – 3.0 m/s	% from 3 - 5 m/s	% from 5 - 10 m/s	% > 10 m/s	Average WS (m/s)
N: 348.75 - 11.25	Offshore	3.59	2.22	1.03	0.33	0.01	2.72
NNE: 11.25 - 33.75	San Nicolas Is.	2.55	1.64	0.55	0.30	0.05	2.87
NE: 33.75 - 56.25	Offshore	2.57	1.68	0.47	0.35	0.06	2.91
ENE: 56.25 - 78.75	Offshore	3.22	1.80	0.81	0.52	0.09	3.24
E: 78.75 - 101.25	SB Co. – Channel Is.	4.24	2.32	1.37	0.49	0.06	3.05
ESE: 101.25 - 123.75	SB Co.	4.47	2.47	1.37	0.53	0.10	3.17
SE: 123.75 - 146.25	Ven. Co. & SB Co.	4.54	2.65	1.37	0.46	0.07	2.98
SSE: 146.25 - 168.75	Ven. Co. – Ventura	3.80	2.58	0.89	0.30	0.02	2.57
S: 168.75 - 191.25	Ven. Co. – Pt. Mugu	3.49	2.52	0.68	0.26	0.03	2.49
SSW: 191.25 - 213.75	Ven. Co. – SE Coast	3.61	2.69	0.70	0.20	0.01	2.38
SW: 213.75 - 236.25	LA Co. – SW Coast	5.24	3.58	1.41	0.24	0.02	2.50
WSW: 236.25 - 258.75	LA Co. - Malibu	9.12	4.25	3.59	1.28	0.01	3.23
W: 258.75 - 281.25	LA Co. – Santa Monica	20.84	6.06	7.49	6.59	0.71	4.42
WNW: 281.25 - 303.75	LA Co. – Long Beach	12.15	4.04	4.14	3.05	0.93	4.55
NW: 303.75 - 326.25	LA Co. - Catalina	10.00	3.80	3.53	2.56	0.12	3.86
NNW: 326.25 - 348.75	Offshore	6.04	2.93	2.15	0.95	0.01	3.24
Totals:		99.45	47.20	31.54	18.41	2.30	
Total number of hours in meteorological data set: 43,848							
Number of calm hours: 242 (wind speeds less than 0.1 m/s)							
Period Ave. Wind Speed: 3.53 m/s							
Calm hours are not included in average wind speeds.							

Wind directions from each of the 16 cardinal compass points are shown in the above table, along with the percentage of winds that emanate from each of the 22.5 degree sectors centered on that direction. The frequency of winds, by wind speed category and for all hours, is listed for each of these sectors. Also shown is the representative downwind area impacted by the winds from each sector.

The predominant winds measured at the Santa Monica Basin Buoy are from the west/southwest to northwest, which directly impact Los Angeles County. This table shows that roughly 57 percent of the Santa Monica Basin Buoy winds blow ashore in Los Angeles County. Winds blow towards Ventura County about 15 percent of the time, and to Santa Barbara County with somewhat less than 10 percent frequency. Offshore winds (not blowing directly towards California) are measured about 18 percent of the time. In essence, emissions from the Project area will blow onshore roughly 80 percent of the time.

This finding is consistent with CARB's analysis of offshore emissions and the potential for these emissions to affect onshore air quality. CARB analyzed the prevailing wind direction, by month, at a number of coastal sites in central and southern California. For stations near the proposed Project, the prevailing wind direction (direction with the highest percent of frequency) blows onshore every month of the year at Santa Barbara, 11 months of the year in Oxnard, nine months of the year at Pt. Mugu Naval Air Station, and 11 months of the year at Santa Monica.¹⁷ These results are supported by tracer studies, modeling exercises, and other analyses considered by CARB.

The modeling impacts from offshore Project sources (using the Santa Monica Basin Buoy data) are shown graphically in Figures 1-1 through 1-16 of the Revised DEIR, Air Quality Appendix G7. Each of these figures show that the proposed Project and marine vessels will increase onshore air concentrations of criteria air pollutants in Ventura and Los Angeles County, including the ozone precursor, NO₂. This is a direct product of the prevailing winds on the Project area, which transport the offshore emissions onto onshore areas.

BHP Billiton, however, does not present any photochemical modeling for ozone formation potential. Rather, the air quality assessment (Revised DEIR Appendix G7, Section 2.1.2) attempts to use the Gaussian OCD modeling approach to support the conclusion that "the unique attributes of the proposed Project demonstrate that there is insignificant potential for the proposed Project to impact the onshore ozone nonattainment area." BHP Billiton does not provide any documentation, peer-reviewed, published, or otherwise, to support their unique method of characterizing ozone impacts from Gaussian dispersion modeling – a method that does not consider photochemical reactions and other parameters necessary to assess ozone impacts. Ozone formation from NO_x and VOC emissions is not linear – BHP Billiton has not shown in any meaningful way that onshore ozone impacts caused by Project emissions will be insignificant.

And sometimes the simplest observation is the most telling: The BHP Billiton methodology for assessing the significance of potential ozone impacts is never used in regulatory ozone attainment analyses. Nonattainment SIP area modeling is complex, and requires detailed studies of three-dimensional meteorological parameters, initial and boundary conditions, photochemistry, regional emission inventories, and other inputs.¹⁸ If the VCAPCD and the SCAQMD applied the flawed BHP Billiton reasoning to their ozone planning and permitting process (which they do not), no source would be culpable for contributing to the ozone nonattainment problem, and no progress at attaining (or at least maintaining) clean air standards would be possible.

Regulatory agencies have long recognized the need to address, reduce, and mitigate (offset) NO_x emissions from offshore sources, including marine vessels. CARB specifically developed a definition of California Coastal Waters for this purpose, defined as "the area offshore of California

¹⁷ California Air Resources Board, Staff Report: Initial Statement of Reasons for Proposed Rulemaking. Proposed Regulation for Auxiliary Diesel-Electric Engines Operated on Ocean-Going Vessels Within California Waters and 24 Nautical Miles of the California Baseline. October 2005. Appendix F: Offshore Emissions Impacts on Onshore Air Quality.

¹⁸ Tesche, T.W. and McNally, D.E., May 1991. Photochemical Modeling of Two 1984 SCCAMP Ozone Episodes. Journal of Applied Meteorology, 30,5,745-763.

within which pollutants are likely to be transported ashore and affect air quality in California's coastal air basins, particularly during the summer."¹⁹ The SCAQMD, with CARB, prepared analyses of potential emission control strategies for marine vessels off of Southern California – the goal being to reduce onshore ozone impacts from these offshore emissions.²⁰ And the Santa Barbara County APCD has stated the problem very clearly: "Marine shipping, the largest unregulated source of oxides of nitrogen (NO_x) emissions, remains a significant long-term obstacle to achieving ozone standards in coastal areas, as documented in the example of Santa Barbara County in California."²¹ The Draft Conformity Determination, by exempting offshore activities from the SIP conformity analysis, is attempting to add the BHP Billiton's FSRU, marine vessel, and offshore construction emissions to this essentially unregulated category.

V. Project Emissions from Higher BTU Gas were not Included

The Revised DEIR briefly addresses the issue of increased regional NO_x emissions that could be caused by higher BTU gas supplied through the proposed LNG terminal.²² This "hotter" gas results from higher concentrations of C2-C4 hydrocarbons (ethane, propane, and butane) in the natural gas itself (which is mainly comprised of methane). Higher BTU gas results in increased combustion temperatures, and therefore potentially greater NO_x emissions, as compared to gas meeting current CARB specifications for compressed natural gas as motor vehicle fuel.²³ Increased NO_x emissions could result from stationary, mobile, and area source use of this potentially higher BTU gas.

The SCAQMD also addresses the increased emissions resulting from combusting higher heating value gas. As presented in the Revised DEIR, such use in stationary source non-residential natural gas-fired equipment could increase NO_x emissions by over 20 percent.²⁴ By not addressing this concern, the veracity of the Draft Conformity Determination is in question. This is a potentially major source of NO_x emissions that have not been incorporated into the area ozone nonattainment SIPs.

This is a perfect example of Project-associated emissions that need to be properly addressed by the Draft Conformity Determination to ensure conformity with the ozone nonattainment SIPs.

VI. Emissions from Construction Activities are Optimistic and Unverifiable

The Draft Conformity Determination presents calculated emissions for each of the various construction phases. These emissions are presented in the table below.

¹⁹ California Air Resources Board, Report to the California Legislature on Air Emissions from Marine Vessels, Volume I, June 1984, p.78.

²⁰ SCAQMD, and CARB, Air Quality Impacts from NO_x Emissions of Two Potential Marine Vessel Control Strategies in the South Coast Air Basin, Final Report, September 2000.

²¹ Murphy, T.M., Santa Barbara County APCD, The Need to Reduce Marine Shipping Emissions – A Santa Barbara County Case Study, AWMA paper, 2003.

²² Revised DEIR, p. 4.6-24.

²³ Letter from Tom Murphy, Santa Barbara County APCD to Lt. Ken Kusano, U.S. Coast Guard and Mr. Cy Oggins, California State Lands Commission, February 25, 2005.

²⁴ Revised DEIR, p. 4.6-24.

Construction Activity	Total Emissions (tons)					
	NO _x	SO ₂	CO	PM ₁₀	PM _{2.5}	ROC
<u>Federal Waters</u>						
Mooring/FSRU Installation	27.4	0.02	33.8	1.6	1.6	4.0
Offshore Pipeline Installation	82.4	0.06	101.5	4.8	4.8	11.9
Subtotal	109.8	0.08	135.3	6.4	6.4	15.9
<u>Ventura County</u>						
Offshore Pipeline Installation	14.5	0.010	17.9	0.8	0.8	2.1
Shore Crossing Construction	37.8	0.027	46.4	3.5	2.5	5.5
Onshore Pipeline Installation - Trenching	16.5	0.017	24.8	1.9	1.4	2.6
Onshore Pipeline Installation - Pipelay	11.5	0.066	57.0	8.0	2.6	3.0
Onshore Pipeline Installation - Boring	5.5	0.004	6.7	1.0	0.5	0.8
Worker Commuting	0.54	0.067	7.9	0.14	0.14	0.25
Subtotal	86.4	0.19	160.7	15.3	8.0	14.1
<u>Los Angeles County</u>						
Onshore Pipeline Installation - Trenching	8.3	0.0084	12.4	0.94	0.71	1.3
Onshore Pipeline Installation - Pipelay	5.8	0.033	28.5	4.0	1.3	1.5
Onshore Pipeline Installation - Drilling	13.0	0.0092	15.9	1.4	0.93	1.9
Worker Commuting	0.41	0.0514	6.1	0.11	0.11	0.19
Subtotal	27.4	0.10	62.9	6.5	3.0	4.8
TOTAL	224	0.37	359	28	17	35

As discussed in Comment III above, the Draft Conformity Determination exempts emissions in Federal waters by attaching the Project to Anacapa Island, finds that Ventura County construction emissions are less than the conformity threshold of 100 tons/year NO_x in a moderate nonattainment area, and determines that construction emissions within Los Angeles County do not conform to the SIP and must be mitigated. The emission offsets for this mitigation are not identified, however.

For the construction emissions in Ventura County, it is easy to identify a construction program and schedule that will exceed the conformity threshold of 100 tons/year NO_x in a moderate nonattainment area. For example, the shore crossing construction emissions calculated for the Draft Conformity Determination include, among many other pieces of equipment, an AHTS (anchor handling/towing supply vessel) operating at only 10% load for 35 days. If the true load factor for this single piece of equipment was in reality 25%, the Ventura County construction emissions would be 100.7 tons/year, which would be non-conforming to the ozone SIP and require offsets. There are many such examples that could result in NO_x emissions greater than 100 tons/year, instead of the calculated 86.4 tons/year, including:

- A slight delay in Project schedule;
- An underestimation of the time required to complete each phase;
- An underestimation of the number of equipment needed to perform any task;
- An underestimation of the equipment size and horsepower to perform any task;
- An underestimation of the equipment load needed for the construction activities.

Construction activities and emissions are not permitted and verified for compliance by the VCAPCD. It is disconcerting to imagine that the construction activities in Ventura County could

result in NO_x emissions much greater than 100 tons/year, and yet the Project would go on without any mitigation at all. Yet this is a distinct possibility given any of the factors listed above and the likelihood of Project delays and difficulties not identified or accounted for in the construction emission calculations.

Based on my experience in calculating and modeling construction emissions, the Draft Conformity Determination is relying on an optimistic schedule and emission inventory. The entire onshore pipeline installation process allocates 180 activity days for trenching a distance of over 22 miles (combined Los Angeles and Ventura County onshore pipeline segments). The Draft Conformity Determination does not provide any comparative studies or examples to support that this implementation schedule is realistic. All assumptions used are undocumented. Also, potentially lengthy delays from pipeline crossings at difficult points, such as Highways 1 and 101 in Ventura County are not discussed. Neither are problems that could be encountered with high water tables, which are likely to be found in southern Ventura County. Delays or underestimated activity days translate into additional construction emissions not accounted for in the Draft Conformity Determination.

While it is helpful to identify what the expected emissions will be from construction, the Draft Conformity Determination does not specify any enforceable compliance conditions for these activities. We are asked to believe that construction scheduling, equipment size and number, and percent of operating power (load) will be as presented and will result in Ventura County NO_x construction emissions less than 100 tons/year.

Unless it can be demonstrated that compliance conditions will be enforced on all construction activities, it is inappropriate for the Draft Conformity Determination to assume that NO_x and other criteria pollutant emissions will not exceed the calculated values. This is particularly important for Ventura County construction emissions which are minimally at 86.4% of the conformity determination threshold for NO_x already. Without enforceable commitments, the Draft Conformity Determination cannot proceed on the assumption that the emissions will conform to the SIP.

VII. The Ozone Attainment Status of Anacapa Island is Irrelevant

Table 1 of the Draft Conformity Determination shows the Federal air quality area designations for Ventura and Los Angeles counties. For Ventura County, there are two areas for designation: the mainland portion, and the Channel Islands, which include Anacapa and San Nicolas islands. Table 1 shows that the Channel Islands are in Federal attainment status for all criteria pollutants except SO₂, which is unclassified due to lack of data.

The history behind the Federal ozone attainment status for Anacapa Island is murky at best. From 1991 through 1994, the VCAPCD used the EPA designation that all of Ventura County is nonattainment for ozone.²⁵ This was based on the November 6, 1991 Federal Register, page 56731, which listed all of Ventura County as the Ventura County nonattainment area. To confuse the

²⁵ Letter from Richard Baldwin, VCAPCD, to David P. Howekamp, EPA Region IX, December 1, 1994.

matter, on the next page (56732) the Federal register designated the South Central Coast (remainder of), Channel Islands, as unclassifiable/attainment, even though Anacapa and San Nicolas Islands are part of Ventura County.²⁶ On December 5, 1996, at the request from the US Navy, the EPA wrote to the VCAPCD that Anacapa and San Nicolas Islands are not part of the Ventura County nonattainment area.²⁷ This letter also references that the VCAPCD Board specifically exempted San Nicolas Island from the AQMP requirements, pending a formal determination from EPA.

That Mainland Ventura County should be nonattainment for ozone and that San Nicolas Island (which is over 50 miles further offshore than Anacapa, and has no historical air quality data) should be attainment/unclassified seems clear. Caught in the middle of this uncertainty, however, is Anacapa Island. Anacapa is relatively near to the mainland – the closest of the Channel Islands, at about 14 miles from shore. Anacapa also has multiple years of air quality data, including ozone measurements.

Hourly ozone readings were collected on Anacapa Island from 1985 through 1992. The percent of data coverage, however, was less than desirable. For example, in 1989 and 1990, only four and two percent coverage during typical periods of high concentration were achieved, respectively. The best year for data collection was 1992, with 82 percent coverage during typical periods of high concentration. The average collection efficiency over the years 1985 through 1992 was only 48.5 percent.²⁸ The air quality monitoring effort at Anacapa Island ended in 1992.

Despite the short duration monitoring program and the relatively low number of hours of ozone data actually collected, Anacapa Island experienced a number of concentrations exceeding the State and Federal ozone standards. In 1988, 1991, and 1992 (the last three years with any meaningful data), there were six, three, and four days, respectively, exceeding the State one-hour ozone standard of $0.09 \mu\text{g}/\text{m}^3$. These three years also had four, three, and three days, respectively, exceeding the Federal eight-hour ozone standard of $0.08 \mu\text{g}/\text{m}^3$. The actual number of days exceeding ozone standards would have been significantly higher if the air pollution regulatory agencies (EPA, CARB, and VCAPCD) rounded up based on the third significant figure, rather than down. Thus, in regulatory algebra, an eight-hour average ozone concentration of $0.084 \mu\text{g}/\text{m}^3$ does not exceed the NAAQS of $0.08 \mu\text{g}/\text{m}^3$. While this makes it easier for the regulatory agencies to demonstrate attainment, it is not a health-protective practice in any sense whatsoever.

An even easier method to “demonstrate” attainment is to just stop measuring any and all air quality data in a particular area. This is apparently what happened on Anacapa Island when the ozone monitoring station was removed, even though ozone concentrations exceeding State and Federal standards were measured on October 13, 1992 – only 18 days before the last data were collected. In a somewhat confusing set of correspondence between the VCAPCD, EPA, and the US Navy, the Federal ozone status for Anacapa became “attainment,” despite contradictory existing ozone measurements, the relatively short distance to the rest of the Ventura County nonattainment area, and the CARB designation for Anacapa as nonattainment for State ozone standards.

²⁶ Ibid.

²⁷ Letter from David P. Howekamp, EPA Region IX to Richard Baldwin, VCAPCD, December 5, 1996.

²⁸ CARB Air Quality Data CD Vol. 1.

For the Draft Conformity Determination, however, the attainment status for Anacapa Island should not matter. Emissions from the Project FSRU, marine vessels, and construction activities will impact onshore ozone nonattainment areas in Ventura and Los Angeles counties. The Clean Air Act requires the Coast Guard to consider whether all Project associated emissions will be consistent with any nonattainment SIPs – this has not been done. As discussed in Comment IV above, offshore NO_x and ROC emissions are transported onshore, where they undergo photochemical reactions to form ozone. In fact, for a source with greater NO_x emissions (relative to ROC), the highest ozone contribution often occurs at greater downwind distances, compared to culpable ozone levels in the near-field areas. This is because time is often needed for these photochemical reactions to occur, and with time the pollutants are advected downstream (and onshore) with the prevailing wind fields. This was demonstrated many times by the Santa Barbara County Air Pollution Control District in their Lagrangian photochemical modeling analyses of potential onshore ozone impacts from offshore oil development NO_x and ROC emissions.²⁹

From a geographical standpoint, the proposed Project is 21.4 miles from Anacapa Island, but only 13.8 miles from the nearest mainland landfall.³⁰ Yet, the proposed Project is deemed by the Draft Conformity Determination to be in the same air quality designation area as Anacapa Island. Interestingly, the closest mainland point to the FSRU is only about 0.4 miles west of the Los Angeles/Ventura County line.³¹ Based on distance alone, the Project should be subject to the much stricter air quality requirements of the serious nonattainment status SCAQMD, and not the much more lax permitting setting that would be enjoyed on Anacapa Island.

There is no question, the Draft Conformity Determination is assisting the applicant in cherry-picking the Federal ozone attainment status that best suits its purpose. Of the three possible options – serious nonattainment within the SCAQMD, moderate nonattainment within the onshore portions of the VCAPCD, or a loophole-filled attainment status for Anacapa Island, the Draft Conformity Determination sides with the least restrictive and most distant set of requirements.

From an air quality standpoint, there is no basis for attaching the proposed Project to the Federal ozone attainment designation for Anacapa Island. The issue at hand is whether the proposed Project will have an onshore air quality impact (it will) and how can this impact be mitigated (offsets of NO_x and ROC); however, the focus of the Draft Conformity Determination appears to be on finding ways to exempt the applicant from proper mitigation, including verifiable offsets for all Project and associated Project emissions. The favorable regulatory and permitting requirements identified in the Draft Conformity Determination aren't valid, and will only interfere with the VCAPCD and SCAQMD progress towards attaining and maintaining ambient air quality standards.

²⁹ For example, such modeling was prepared for the Exxon Santa Ynez Unit FEIS/R.

³⁰ Revised DEIR, Figure 2.1-2. 12.01 NM = 13.8 miles; 18.61 NM = 21.4 miles.

³¹ Ibid. The analogy of placing a casino on the left side of a jurisdictional boundary, while gambling is illegal on the right side, is inescapable.

VIII. The Draft Conformity Determination did not Identify Project Offsets, thus Circumventing Public Comment on this Issue

Because of the multiple non-conservative assumptions used in the Draft Conformity Determination, the only identified mitigation requirements are for pipeline construction NO_x emissions within Los Angeles County. It is important to step back and comprehend this finding. A project with calculated (and optimistic) construction NO_x emissions of 223 tons/year, operational and marine vessel NO_x emissions of at least 231.3 tons/year, startup NO_x emissions of 42.3 tons/year, and which is located next to and upwind of moderate and serious nonattainment areas for ozone, is only required to mitigate temporary NO_x emissions of 27.4 tons.

It gets worse. The Draft Conformity Determination, however, does not even identify how the 27.4 tons of NO_x emissions will be mitigated. In its Findings, the Draft Conformity Determination states that BHP Billiton has not provided documentation necessary to support emission reductions or any mitigation, and "Upon receipt of required documentations from BHPB, a final General Conformity Determination will be issued."³²

It is not clear whether the Coast Guard intends that the public will have an opportunity to comment on the Final Conformity Determination.

It is imperative that the Draft Conformity Determination be corrected to identify that all Project and Project-associated emissions will require mitigation through verifiable offsets. In addition, the Draft Conformity Determination must include documentation from BHP Billiton, EPA, CARB, and the air districts verifying that these binding offsets have been procured for the life of the Project operational and construction emissions. The public must be provided with an opportunity to comment on this important information.

³² Draft Conformity Determination, p.8.

IX. Conclusion

The Draft Conformity Determination is unreliable for purposes of verifying conformity with the Ventura County and South Coast Air Basin nonattainment SIPs – it must be corrected using data, calculations, and analyses that will adequately characterize and identify the full scope of Project emissions. Rather than assess the Project using conformity determinations for three separate and adjacent attainment/nonattainment planning areas, the Coast Guard must evaluate all Project emissions as contributing to the onshore ozone nonattainment problem for Ventura and Los Angeles counties. Accordingly, all operational, construction, marine vessel, and other associated emissions must be evaluated and mitigated with verifiable offsets greater than or equal to the total Project emissions liability. Only then can the Draft Conformity Determination adequately verify compliance with the applicable nonattainment SIPs.

Thank you for the opportunity to comment on the Draft Conformity Determination.

Sincerely,

A handwritten signature in cursive script that reads "Camille Sears".

Camille Sears

Attachments

Summary

I have 25 years of regulatory and private-sector experience in air quality impact analyses, health risk assessments, meteorological monitoring, and geographic information systems. I specialize in litigation support; I have successfully provided testimony in numerous cases, both as an individual consultant and as part of a team of experts.

Education

- M.S., Atmospheric Science, University of California, Davis, 1980.
- B.S., Atmospheric Science, University of California, Davis, 1978.

Air Dispersion Modeling

- I am experienced in applying many different air dispersion models, including programs still in the development phase. I have prepared well over 1,000 air dispersion modeling analyses requiring the use of on-site or site-specific meteorological data. These runs were made with the USEPA ISC, OCD, MESOPUFF, INPUFF, CALPUFF, ISC-PRIME, AERMOD, COMPLEX-I, MPTER, and other air dispersion models.
- I prepared and submitted technical comments to the USEPA on beta-testing versions of AERMOD; these comments are being addressed and will be incorporated into the model and instructions when it is ready for regulatory application.
- I am experienced in performing air dispersion modeling for virtually every emission source type imaginable. I have modeled:
 - Refineries and associated activities;
 - Mobile sources, including cars, trains, airplanes, trucks, and ships;
 - Power plants, including natural gas and coal-fired;
 - Smelting operations;
 - Area sources, such as housing tracts, biocides from agricultural operations, landfills, airports, oil and gas seeps, and ponds;
 - Volume sources, including fugitive emissions from buildings and diesel construction combustion emissions;
 - Small sources, including dry cleaners, gas stations, surface coating operations, plating facilities, medical device manufacturers, coffee roasters, ethylene oxide sterilizers, degreasing operations, foundries, and printing companies;
 - Cooling towers and gas compressors;
 - Diatomaceous earth, rock and gravel plants, and other mining operations;
 - Offshore oil platforms, drilling rigs, and processing activities;
 - Onshore oil and gas exploration, storage, processing, and transport facilities;
 - Fugitive dust emissions from roads, wind erosion, and farming activities;
 - Radionuclide emissions from actual and potential releases.
- I have extensive experience in modeling plume depletion and deposition from air releases of particulate emissions.
- As a senior scientist, I developed the Santa Barbara County Air Pollution Control District (SBAPCD) protocol on air quality modeling. I developed extensive modeling capabilities for the SBAPCD on VAX 8600 and Intel I-860 computer systems; I acted as systems analyst for the SBAPCD air quality modeling system; I served as director of air quality analyses for numerous major energy projects; I performed air quality impact analyses using inert and photochemical models, including EPA, ARB and private-sector models; I performed technical review and evaluating air quality and wind field models; I developed software to prepare model inputs consistent with the SBAPCD protocol on air quality modeling for OCD, OCDCPM, MPTER, COMPLEX-I/II and ISC.
- I provided detailed review and comments on the development of the Minerals Management Service OCD model. I developed the technical requirements for and

supervised the development of the OCDCPM model, a hybrid of the OCD, COMPLEX-I and MPTER models.

- I prepared the "Modeling Exposures of Hazardous Materials Released During Transportation Incidents" report for the California Office of Environmental Health Hazard Assessment (OEHHA). This report examines and rates the ADAM, ALOHA, ARCHIE, CASRAM, DEGADIS, HGSYSTEM, SLAB, and TSCREEN models for transportation accident consequence analyses of a priority list of 50 chemicals chosen by OEHHA. The report includes a model selection guide for adequacy of assessing priority chemicals, averaging time capabilities, isopleth generating capabilities, model limitations and concerns, and model advantages.
- I am experienced in assessing uncertainty in emission rate calculations, source release, and dispersion modeling. I have developed numerous probability distributions for input to Monte Carlo simulations, and I was a member of the External Advisory Group for the California EPA *Air Toxics Hot Spots Program Risk Assessment Guidelines, Part IV, Technical Support Document for Exposure Assessment and Stochastic Analysis*.

Health Risk Assessment

- I have prepared more than 300 health risk assessments of major air toxics sources. These assessments were prepared for AB 2588 (the Air Toxics "Hot Spots" Information and Assessment Act of 1987), Proposition 65, and other exposure analysis activities. More than 120 of these exposure assessments were prepared for Proposition 65 compliance verification in a litigation support setting.
- I reviewed approximately 300 other health risk assessments of toxic air pollution sources in California. The regulatory programs in this review include AB 2588, Proposition 65, the California Environmental Quality Act, and other exposure analysis activities. My clients include the California Attorney General's Office, the Los Angeles County District Attorney's Office, the SBAPCD, the South Coast Air Quality Management District, numerous environmental and community groups, and several plaintiff law firms.
- I am experienced in assessing public health risk from continuous, intermittent, and accidental releases of toxic emissions. I am experienced in generating graphical presentations of risk results, and characterizing risks from carcinogenic and acute and chronic noncarcinogenic pollutants.
- I am experienced in communicating adverse health risks discovered through the Proposition 65 and AB 2588 processes. I have presented risk assessment results in many public settings -- to industry, media, and the affected public.
- For four years, I was the Air Toxics Program Coordinator for the SBAPCD. My duties included: developing and managing the District air toxics program; supervising District staff assigned to the air toxics program; developing District air toxics rules, regulations, policies and procedures; management of all District air toxics efforts, including AB 2588, Proposition 65, and federal activities; developing and tracking the SBAPCD air toxics budget.
- I have prepared numerous calculations of exposures from indoor air pollutants. A few examples include: diesel PM₁₀ inside school buses, formaldehyde inside temporary school buildings, lead from disturbed paint, phenyl mercuric acetate from water-based paints and drywall mud, and tetrachloroethene from recently dry-cleaned clothes.

Litigation Support

- I have prepared numerous analyses in support of litigation, both in Federal and State Courts. I am experienced in preparing F.R.C.P. Rule 26(a)(2) expert reports and providing deposition and trial testimony (I have prepared eight Rule 26 reports). Much of my work is focused on human dose and risk reconstruction resulting from multiple air emission sources (lifetime and specific events).

- I am experienced in preparing declarations (many dozens) and providing expert testimony in depositions and trials (see my testimony history).
- I am experienced in providing support for legal staff. I have assisted in preparing numerous interrogatories, questions for depositions, deposition reviews, various briefs and motions, and general consulting.
- Recent examples of my work include:

DTSC v. Interstate Non-Ferrous; United States District Court, Eastern District of California (2002).

In this case I performed air dispersion modeling, downwind soil deposition calculations, and resultant soil concentrations of dioxins (TCDD TEQ) from historical fires at a smelting facility. I prepared several Rule 26 Reports in my role of assisting the California Attorney General's Office in trying this matter.

Akee v. Dow et al.; United States District Court, District of Hawaii (2003-2004).

In this case I performed air dispersion modeling used to quantify air concentrations and reconstruct intake, dose, excess cancer risk, and noncancer chronic hazard indices resulting from soil fumigation activities on the island of Oahu, Hawaii. I modeled 319 separate AREAPOLY pineapple fields for the following chemicals: DBCP, EDB, 1,3-trichloropropene, 1,2-dichloropropane, and epichlorohydrin. I calculated chemical flux rates and modeled the emissions from these fumigants for years 1946 through 2001 (56 years) for 34 test plaintiffs and 97 distinct home, school, and work addresses. I prepared a Rule 26 Expert Report, successfully defended against Daubert challenges, and testified in trial.

Lawrence O'Connor v. Boeing North America, Inc., United States District Court, Central District of California, Western Division (2004-2005).

In this case I performed air dispersion modeling, quantified air concentrations, and reconstructed individual intake, dose, and excess cancer risks resulting from approximately 150 air toxics sources in Los Angeles and Ventura Counties, California. I prepared these analyses for years 1950 through 2000 (51 years) for 173 plaintiffs and 741 distinct home, school, and work addresses. I prepared several Rule 26 Reports, and the case settled on the eve of trial in September, 2005. Defendants did not attempt a Daubert challenge of my work.

- I have prepared hundreds of individual and region-wide health risk assessments in support of litigation. These analyses include specific sub-tasks, including: calculating emission rates, choosing proper meteorological data inputs, performing air dispersion modeling, and quantifying intake, dose, excess cancer risk, and acute/chronic noncancer health effects.
- I have prepared over 120 exposure assessments for Proposition 65 litigation support. In these analyses, my tasks include: reviewing AB 2588 risk assessments and other documents to assist in verifying compliance with Proposition 65; preparing exposure assessments consistent with Proposition 65 Regulations for carcinogens and reproductive toxicants; using a geographic information system (Atlas GIS) to prepare exposure maps that display areas of required warnings; calculating the number of residents and workers exposed to levels of risk requiring warnings (using the GIS); preparing declarations, providing staff support, and other expert services as required. I have also reviewed scores of other assessments for verifying compliance with Proposition 65. My proposition 65 litigation clients include the California Attorney General's Office, the Los Angeles County District Attorney's Office, As You Sow, California Community Health Advocates, Center for Environmental Health, California Earth Corps, Communities for a Better Environment, Environmental Defense Fund, Environmental Law Foundation, and People United for a Better Oakland.

Geographic Information Systems

- ArcGIS: I am experienced in preparing presentation and testimony maps using ArcView. I developed methods to convert AutoCAD DXF files to ArcView polygon theme shape files for use in map overlays.

- I have created many presentation maps with ArcView using MrSID DOQQ and other aerial photos as a base and then overlaying exposure regions. This provides a detailed view (down to the house level) of where air concentrations and health risks are projected to occur.
- Using ArcView, I have created numerous presentations using USGS Topographic maps (as TIFF files) as the base on to which exposure regions are overlaid.
- MapInfo for Windows: I prepared numerous presentation maps including exposure isopleths, streets and highways, and sensitive receptors, labels. I developed procedures for importing Surfer isopleths in AutoCAD DXF format as a layer into MapInfo.
- Atlas GIS: I am experienced in preparing presentation maps with both the Windows and DOS versions of Atlas GIS. In addition to preparing maps, I use Atlas GIS to aggregate census data (at the block group level) within exposure isopleths to determine the number of individuals living and working within exposure zones. I am also experienced in geocoding large numbers of addresses and performing statistical analyses of exposed populations.
- I am experienced in preparing large-scale graphical displays, both in hard-copy and for PowerPoint presentations. These displays are used in trial testimony, public meetings, and other litigation support.
- I developed a Fortran program to modify AutoCAD DXF files, including batch-mode coordinate shifting for aligning overlays to different base maps.

Ozone and Long-Range Transport

- I developed emission reduction strategies and identified appropriate offset sources to mitigate project emissions liability. For VOC offsets, I developed and implemented procedures to account for reactivity of organic compound species for ozone impact mitigation. I wrote Fortran programs and developed a chemical database to calculate ozone formation potential using hydroxyl radical rate constants and an alkane/non-alkane reactive organic compound method.
- I provided technical support to the Joint Interagency Modeling Study and South Central Coast Cooperative Aerometric Monitoring Program. With the SBAPCD, I provided technical comments on analyses performed with the EKMA, AIRSHED, and PARIS models. I was responsible for developing emissions inventory for input into regional air quality planning models.
- I was the project manager for the Santa Barbara County Air Quality Attainment Plan Environmental Impact Report (EIR). My duties included: preparing initial study; preparation and release of the EIR Notice of Preparation; conducting public scoping hearings to obtain comments on the initial study; managing contractor efforts to prepare the draft EIR.
- I modified, tested, and compiled the Fortran code to the MESOPUFF model (the precursor to CALPUFF) to incorporate critical dividing streamline height algorithms. The model was then applied as part of a PSD analysis for a large copper-smelting facility.
- I am experienced in developing and analyzing wind fields for use in long-range transport and dispersion modeling.
- I have run CALPUFF numerous times. I use CALPUFF to assess visibility effects and both near-field and mesoscale air concentrations from various emission sources, including power plants.

Emission Rate Calculation

- I developed methods to estimate and verify source emission rates using air pollution measurements collected downwind of the emitting facility, local meteorological data, and dispersion models. This technique is useful in determining whether reported source emission rates are reasonable, and based on monitored and modeled air concentrations, revised emission rates can be created.

- I am experienced in developing emission inventories of hundreds of criteria and toxic air pollutant sources. I developed procedures and programs for quantifying emissions from many air emission sources, including: landfills, diesel exhaust sources, natural gas combustion activities, fugitive hydrocarbons from oil and gas facilities, dry cleaners, auto body shops, and ethylene oxide sterilizers.
- I have calculated flux rates (and modeled air concentrations) from hundreds of biocide applications to agricultural fields. Emission sources include aerial spraying, boom applications, and soil injection of fumigants.
- I am experienced in calculating emission rates using emission factors, source-test results, mass-balance equations, and other emission estimating techniques.

Software Development

- I am skilled in computer operation and programming, with an emphasis on Fortran 95.
- I am experienced with numerous USEPA dispersion models, modifying them for system-specific input and output, and compiling the code for personal use and distribution. I own and am experienced in using the following Fortran compilers: Lahey Fortran 95, Lahey Fortran 90 DOS-Extended; Lahey F77L-EM32 DOS-Extended; Microsoft PowerStation 32-bit DOS-Extended; and Microsoft 16-bit.
- I configured and operated an Intel I-860 based workstation for the SBAPCD toxics program. I created control files and recoded programs to run dispersion models and risk assessments in the 64-bit I-860 environment (using Portland Group Fortran).
- Using Microsoft Fortran PowerStation, I wrote programs to extract terrain elevations from both 10-meter and 30-meter USGS DEM files. Using a file of discrete x,y coordinates, these programs extract elevations within a user-chosen distance for each x,y pair. The code I wrote can be run in steps or batch mode, allowing numerous DEM files to be processed at once.
- I have written many hundreds of utilities to facilitate data processing, entry, and quality assurance. These utility programs are a "tool chest" from which I can draw upon to expedite my work.
- While at the SBAPCD, I designed the ACE2588 model - the first public domain multi-source, multi-pathway, multi-pollutant risk assessment model. I co-developed the structure of the ACE2588 input and output files, supervised the coding of the model, tested the model for quality assurance, and for over 10 years I provided technical support to about 200 users of the model. I was responsible for updating the model each year and ensuring that it is consistent with California Air Pollution Control Officer's Association (CAPCOA) Risk Assessment Guidelines.
- I developed and coded the ISC2ACE and ACE2 programs for distribution by CAPCOA. These programs were widely used in California for preparing AB 2588 and other program health risk assessments. ISC2ACE and ACE2 contain "compression" algorithms to reduce the hard drive and RAM requirements compared to ISCST2/ACE2588. I also developed ISC3ACE/ACE3 to incorporate the revised ISCST3 dispersion model requirements.
- I developed and coded the "HotSpot" system - a series of Fortran programs to expedite the review of air toxics emissions data, to prepare air quality modeling and risk assessment inputs, and to prepare graphical risk presentations.
- I customized ACE2588 and developed a mapping system for the SBAPCD. I modified the ACE2588 Fortran code to run on an Intel I-860 RISC workstation; I updated programs that allow SBAPCD staff to continue to use the "HotSpot" system - a series of programs that streamline preparing AB 2588 risk assessments; I developed a risk assessment mapping system based on MapInfo for Windows which linked the MapInfo mapping package to the "HotSpot" system.
- I developed software for electronic submittal of all AB 2588 reporting requirements for the SBAPCD. As an update to the "HotSpot" system software, I created software that allows facilities to submit all AB 2588 reporting data, including that needed for risk prioritization, exposure assessment, and presentation mapping. The data submitted

by the facility is then reformatted to both ATDIF and ATEDS formats for transmittal to the California Air Resources Board.

- I developed and coded Fortran programs for AB 2588 risk prioritization; both batch and interactive versions of the program were created. These programs were used by several air pollution control districts in California.

Air Quality and Meteorological Monitoring

- I was responsible for the design, review, and evaluation of an offshore source tracer gas study. This project used both inert tracer gas and a visible release to track the onshore trajectory and terrain impact of offshore-released buoyant plumes.
- I developed the technical requirements for the Santa Barbara County Air Quality/Meteorological Monitoring Protocol. I developed and implemented the protocol for siting pre- and post-construction air quality and meteorological PSD monitoring systems. I determined the instrumentation requirements, and designed and sited over 30 such PSD monitoring systems. Meteorological parameters measured included ambient temperature, wind speed, wind direction, sigma-theta (standard deviation of horizontal wind direction fluctuations), sigma-phi (standard deviation of vertical wind direction fluctuations), sigma-v (standard deviation of horizontal wind speed fluctuations), and sigma-w (standard deviation of vertical wind speed fluctuations). Air pollutants measured included PM₁₀, SO₂, NO, NO_x, NO₂, CO, O₃, and H₂S.
- I was responsible for data acquisition and quality assurance for an offshore meteorological monitoring station. Parameters measured included ambient temperature (and delta-T), wind speed, wind direction, and sigma-theta.
- In coordination with consultants performing air monitoring for verifying compliance with Proposition 65 and other regulatory programs, I wrote software to convert raw meteorological data to hourly-averaged values formatted for dispersion modeling input.
- Assisting the Ventura Unified School District, I collected air, soil, and surface samples and had them analyzed for chlorpyrifos contamination (caused by spray drift from a nearby citrus orchard). I also coordinated the analysis of the samples, and presented the results in a public meeting.
- Using summa canisters, I collected numerous VOC samples to characterize background and initial conditions for use in Santa Barbara County ozone attainment modeling. I also collected samples of air toxics (such as xylenes downwind of a medical device manufacturer) to assist in enforcement actions.
- For the California Attorney General's Office, I purchased, calibrated, and operated a carbon monoxide monitoring system. I measured and reported CO air concentrations resulting from numerous types of candles, gas appliances, and charcoal briquettes.

Support, Training, and Instruction

- For 10 years, I provided ACE2588 risk assessment model support for CAPCOA. My tasks included: updating the ACE2588 risk assessment model Fortran code to increase user efficiency and to maintain consistency with the CAPCOA Risk Assessment Guidelines; modifying the Fortran code to the EPA ISC model to interface with ACE2588; writing utility programs to assist ACE2588 users; updating toxicity data files to maintain consistency with the CAPCOA Risk Assessment Guidelines; developing the distribution and installation package for ACE2588 and associated programs; providing technical support for all users of ACE2588.
- I instructed approximately 20 University Professors through the National Science Foundation Faculty Enhancement Program. Instruction topics included: dispersion modeling, meteorological data, environmental fate analysis, toxicology of air pollutants, and air toxics risk assessment; professors were also trained on the use of the ISC2ACE dispersion model and the ACE2 exposure assessment model.
- I was the instructor of the Air Pollution and Toxic Chemicals course for the University of California, Santa Barbara, Extension certificate program in Hazardous Materials Management. Topics covered in this course include: detailed review of criteria and

noncriteria air pollutants; air toxics legislation and regulations; quantifying toxic air contaminant emissions; criteria and noncriteria pollutant monitoring; air quality modeling; health risk assessment procedures; health risk management; control/mitigating air pollutants; characteristics and modeling of spills and other short-term releases of air pollutants; acid deposition, precipitation and fog; indoor/occupational air pollution; the effect of chlorofluorocarbons on the stratospheric ozone layer. I taught this course for five years.

- I have trained numerous regulatory staff on the mechanics of dispersion modeling, health risk assessments, emission rate calculations, and presentation mapping. I provided detailed training to SBAPCD staff in using the HARP program, and in comparing and contrasting ACE2588 analyses to HARP.
- Through UCSB Extension, I taught a three-day course on dispersion modeling, preparing health risk assessments, and presentation mapping with Atlas GIS and MapInfo.
- I hold a lifetime California Community College Instructor Credential (Certificate No. 14571); Subject Matter Area: Physics.
- I have presented numerous guest lectures – at universities, public libraries, farm groups, and business organizations.

Affiliations

- American Meteorological Society (former president, Ventura/Santa Barbara County Chapter).

Publications

- To establish a legal record and to assist in environmental review, I prepared and submitted dozens of detailed comment letters to regulatory and decision-making bodies.
- I have contributed to over 100 Environmental Impact Statements/Reports and other technical documents required for regulatory decision-making.
- I prepared two software review columns for the *Journal of the Air and Waste Management Association*.

Employment History

- | | |
|---|--------------|
| • Self-Employed Air Quality Consultant | 1992 to 2006 |
| • Santa Barbara County APCD, Senior Scientist | 1988 to 1992 |
| • URS Consultants, Senior Scientist | 1987 to 1988 |
| • Santa Barbara County APCD, Air Quality Engineer | 1983 to 1987 |
| • Dames and Moore, Meteorologist | 1982 to 1983 |
| • UC Davis, Research Associate | 1980 to 1981 |

Testimony History

- People of the State of California v. McGhan Medical, Inc.
Deposition: Two dates: June - July 1990
- People of the State of California v. Santa Maria Chili
Deposition: Two dates: August 1990
- California Earth Corps v. Johnson Controls, Inc.
Deposition: October 26, 1995
- Dale Anderson v. Pacific Gas & Electric
Deposition: January 4, 1996
Arbitration: January 17, 1996
- Adams v. Shell Oil Company
Deposition: July 3, 1996
Trial: August 21, 1996
Trial: August 22, 1996

- California Earth Corps v. Teledyne Battery Products
Deposition: January 17, 1997
- Marlene Hook v. Lockheed Martin Corporation
Deposition: December 15, 1997
- Lawrence O'Connor v. Boeing North America, Inc.
Deposition: May 8, 1998
- Bristow v. Tri Cal
Deposition: June 15, 1998
- Abeyta v. Pacific Refining Co.
Deposition: January 16, 1999
Arbitration: January 25, 1999
- Danny Aguayo v. Betz Laboratories, Inc.
Deposition: July 10, 2000
Deposition: July 11, 2000
- Marlene Hook v. Lockheed Martin Corporation
Deposition: September 18, 2000
Deposition: September 19, 2000
- Tressa Haddad v. Texaco
Deposition: March 9, 2001
- California DTSC v. Interstate Non-Ferrous
Deposition: April 18, 2002
- Akee v. Dow et al.
Deposition: April 16, 2003
Deposition: April 17, 2003
Deposition: January 7, 2004
Trial: January 17, 2004
Trial: January 20, 2004
- Center for Environmental Health v. Virginia Cleaners
Deposition: March 4, 2004
- Lawrence O'Connor v. Boeing North America, Inc.
United States District Court, Central District of California,
Western Division. Case No. CV 97-1554 DT (RCx)
Deposition: March 1, 2005
Deposition: March 2, 2005
Deposition: March 3, 2005
Deposition: March 15, 2005
Deposition: April 25, 2005
- Clemente Alvarez, et al, v. Western Farm Service, Inc.
Superior Court of the State of California
County of Kern, Metropolitan Division. Case No. 250 621 AEW
Deposition: April 11, 2005

Other Interests

- I have a small urban farm: CCOF-certified organic since 1997, growing tangerines, figs, cantaloupes, apricots, plums, peaches, herbs, and bamboo.
- I'm also a food and garden writer for Edible Ojai and Edible Communities.

Sears, Camille. 2006. Letter to Docket Management Facility (U.S. Department of Transportation) Re: Cabrillo Port Liquefied Natural Gas Deepwater Port Project Draft Conformity Determination Comments. April 13.

For ATTACHMENTS to this letter, SEE:

Sears, Camille. 2006. Letter to Mr. Dwight E. Sanders (California State Lands Commission) Re: State Clearinghouse Number 2004021107: Cabrillo Port Liquefied Natural Gas Deepwater Port Project Revised Draft Environmental Impact Report Comments. May 5.